

Demonstration of Advanced Ensemble Prediction Services for NWS Hydrometeorological
Forecast Operations

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Abstract: The state of the art of real-time National Weather Service (NWS) hydrological forecast operations requires the integration of precipitation and land surface monitoring, forecasting of precipitation and surface runoff, and delivery of flood and water supply forecasts to emergency response and water system managers. There is promise that NWS hydrological operations and more specifically, flash flood forecasting, can be improved through application of advances in monitoring, data assimilation, process modeling and overall systems integration to provide higher resolution (space and time) products tailored to the needs of specific user groups. This proposal extends on-going research and development efforts within the NOAA Hydrometeorology Testbed (HMT), NCAR, and the new NWS National Water Center to involve existing NWS hydrological services staff responsible for integrating new technologies into seamless flood and water supply forecast and warning operations.

Existing research by the investigator team in multiple regions of the U.S. using the WRF-Hydro modeling system has demonstrated plausible potential improvements to coupled weather-hydrology forecasting via the incorporation of operational and quasi-operational QPF with advanced hydrometeorological data assimilation and modeling capabilities. The team proposes to capitalize on these existing efforts by generating probabilistic QPF information from high-resolution, convection-allowing forecasts (as generated by the operational and research versions of the High Resolution Rapid Refresh (HRRR) model) and incorporating these innovative QPF products into a physics-based, distributed hydrologic modeling framework (WRF-Hydro) to produce improved combined hydrometeorological forecasts and help communicate the associated risks to forecasters and end-users.